What is claimed is:

1. A photolithographic reduction projection catadioptric objective with a beam path, comprising: a first optical group (G1) including an even number of at least four mirrors (M1-M6); and a second at least substantially dioptric optical group (G2) more imageward than said first optical group including a number of lenses (E4-E13), and wherein said first optical group (GI) provides compensative axial colour correction for said second optical group (G2).

2. The objective of Claim 1, wherein said image is formed with a numerical aperture of at least substantially 0.65.

3. The objective of Claim 1, said first optical group producing an intermediate virtual image (VF).

4. The objective of Claim 1, wherein said at least four mirrors (M1-M6) of said first optical group (G1) include a convex mirror (M6) arranged most imageward in the beam path of the objective, and wherein said second optical group (G2) receives a beam from said convex mirror (M6).

5. The objective of Claim 1, wherein optical surfaces of each minor MI-M6 of said objective are at least sections of surfaces of revolution each having a common axis (A) of symmetry.

6. The objective of Claim 1, wherein said second optical group is configured for independent compensative lateral aberrative correction.

7. A photolithographic reduction projection catadioptric objective, comprising: a first optical group (G1) including an even number of at least four mirrors (M1-M6) for producing a virtual intermediate image (VI); and a second at least substantially dioptric optical group (G2) more imageward than said first optical group (G1), said second optical group (G2) including a number of lenses (E4-E13) for receiving the virtual image (VI) and providing image reduction, and wherein said first optical group (G1) provides compensative axial colour correction for said second optical group (G2).

8. The objective of Claim 7, wherein said second optical group (G2) is configured for independent compensative lateral colour correction.

9. The objective of claim 1, wherein said image is formed with a numerical aperture of at least substantially 0.70.

10. The objective of claim 1, wherein said image is formed with a numerical aperture of at least substantially 0.75.

11. A photolithographic reduction projection catadioptric objective, comprising: a first optical group (G1) including an even number of at least four mirrors (M1.M6) including a convex most imageward mirror (M6), and a second at least substantially dioptric optical group (G2) more imageward than said first optical group (G1) receiving a beam from the convex most imageward mirror (M6} of the first optical group (G1), said second optical group (G2) including a number of lenses (E4-E13) providing image reduction, and wherein said first optical group (G1) provides compensative axial colour correction for said second optical group (G2).

12. The objective of Claim 9, wherein said second optical group (G2) is configured for independent compensative lateral color correction.

13. A photolithographic reduction projection catadioptric objective, comprising: a first optical group (G1) including an even number of at least six mirrors (M1-M6); and a second at least substantially dioptric optical group more imageward than said first optical group (G1) including a number of lenses (E4-E13) for providing image reduction.

14. The objective of Claim 11, wherein said image is formed with a numerical aperture of at least substantially 0.65.

15. The objective of Claim 11, said first optical group (G1) producing an intermediate virtual image (VI).

16. The objective of Claim 11, wherein said at least six mirrors (M1-M6) of said first optical group (G1) include a convex most imageward mirror (M6}, and wherein said second optical group (G2) receives a beam from said convex most imageward mirror (M6).

17. The objective of Claim 11, wherein optical surfaces of each mirror of said objective are at least sections of surfaces of revolution each having a common axis of symmetry (A).

18. The objective of Claim 11, wherein said second optical group (G2) is configured for independent compensative lateral colour correction.

19. The objective of Claim 11, further comprising an unobscured system aperture (AS).

20. The objective of Claim 17, wherein said unobscured aperture AS is located within said second optical group (G2).

21. The objective of Claim 11, further being devoid of any planar folding mirrors.

22. The objective of Claim 11, wherein an optical beam incident at said first optical group (G1) is divergent after a most imageward mirror (M6) of said first optical group (G1).

23. The objective of Claim 11, which is further an unobscured system comprising parallel axes (A) of symmetry of curvatures of each optical element (M1-M6, E1-E13) of said first (G1) and second optical groups (G2), and wherein no more than three (M3, M4, M5) of said optical elements are cut to deviate in a substantially non-rotationally symmetric form.

24. The objective of Claim 11, comprising in sequence, in an optical direction form an object (Ob) side of said objective before said first optical group (G1) to an image (Im) side of said objective after said second optical group (G2), a first catadioptric sub group (E1-M4) for producing a real intermediate image (IMI), a second sub group (M5, M6) including catoptric components for producing a virtual image (VI), and said second at least substantially dioptric group (G2) for producing a real image.

25. The objective of Claim 11, comprising in sequence, in an optical direction from an object side of said objective before said first optical group (G1) to an image (Im) side of said objective after said second optical group (G2), a first field lens sub group (E1), a

second catadioptric sub group comprising one or more negative lenses (E2, E3) and a concave mirror (M2), generating axial chromatic aberration, a third sub group including an odd number of catoptric components (M4, M5, M6), and a fourth positive lens group (G2).

26. The objective of Claim 11, wherein said second optical group (G2) comprises a plurality of lenses (E4-E13), wherein a diameter of a beam incident upon each of said plurality of lenses is at least half of a diameter of said each lens (E4-E13).

27. The objective of Claim 11, wherein said objective is doubly telecentric.

28. The objective of Claim 11, wherein optical paths of projected rays are redirected at each lens element (E4-E13) of said second optical group at an angle of less than substantially 20°.

29. The objective of Claim 11, wherein said image is formed with a numerical aperture of at least substantially 0.70.

30. The objective of Claims 11, wherein said image is formed with a numerical aperture of at least substantially 0.75.